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EXAMINER

CHANAY, CAROL DIANE

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 09/29/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|------------------------------|-----------------|-----------------|
| | 10/019,231 | KOSCHANY, PETRA |
| Examiner | Art Unit | |
| Carol Chaney | 1745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 28 December 2001 .

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-16 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-12 and 14-16 is/are rejected.

7) Claim(s) 13 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____ .
2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)
3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6. 6) Other: _____ .

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 5, 7, 9-12, and 14-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "certain time spans" in claim 3 is a relative term which renders the claim indefinite. The term "certain time spans" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

In claim 5, the phrase "having diffusion properties" is indefinite because the type of diffusion intended and the type of properties intended are not specified.

In claim 7, the phrase "the total of the channel section area decreases" is indefinite because "total" suggests a single value, which cannot also decrease.

In claims 9 and 10 the phrase "close to a cylinder" is indefinite because the phrase could refer to either a fuel cell stack which is substantially a cylindrical shape, or a fuel cell stack which is spatially located nearby a cylinder.

In claims 11 and 12 the phrase "ratio heat conductivity parallel to the membrane to density of > 0.04 W m²/(kg K)" is indefinite, failing to conform with current U.S. practice.

The terms "strongly hydrophobic" and "small pore size" in claims 14-16 are relative terms which renders the claims indefinite. The terms are not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

In claim 15, the phrase "filled among others with an electrically conductive material" is indefinite because it is unclear if the claimed porous stretched PTFE is filled with a plurality of materials, of which one must be an electrically conductive material, or is filled with materials, of which could be electrically conductive materials.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawana et al., JP 59 117074.

Kawana et al. disclose a fuel cell in which the amount of air supplied to the cathode chamber is 2-50 times greater than the theoretical (stoichiometric) amount of air required. As shown in Figure 2, part of the cathode layer (2) is equipped with ducts by means of the channels (4) formed in plate (11) which abuts the cathode layer. The

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channels allow an air flow parallel to the ion-exchange membrane. With regards to claim 5, air diffuses through the cathode disclosed by Kawana et al. to allow electrochemical reaction of oxygen to occur. therefore the cathode layer has "diffusion properties". With regards to claims 6 and 8, the air penetration ducts are shown in the Kawana et al. Figure 2, reference number 4. Thus, the claims are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawana et al., JP 59 117074 A in view of Kothmann, US Patent 4,582,776.

As discussed above, Kawana et al. disclose applicants' invention essentially as claimed, with the exception that Kawana et al. do not disclose reversing air flow direction in the fuel cell system. Kothmann discloses periodic reversal of the direction of the flow of cooling fluid, typically helium or air, (column 4, lines 19-24) through a fuel cell stack provides greater uniformity of cell operating temperature. With regards to claim 10, the coolant disclosed by Kothmann is circulated by a blower or pump. (Column 4, lines 36-39.) Since the air in the Kawana et al. invention is used as a coolant as well as an oxidant, it would have been obvious to one of ordinary skill in the art to periodically

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reverse the flow of air in the Kawana et al. fuel cell in order to provide a more uniform cell temperature, as taught by Kothmann.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawana et al., JP 59 117074 A in view of MacKelvie, WO 99/67845.

As discussed above, Kawana et al. disclose applicants' invention essentially as claimed, with the exception that Kawana et al. do not disclose a fuel cell with a circular cross section. MacKelvie discloses fuel cells with circular flow field plates. These circular plates are taught as being effective and relatively simple and economical to manufacture. (Page 1, lines 26-28.) The design is also taught as reducing the necessity for large diameter O-rings, which are expensive and difficult to assemble. (Page 3, lines 11-14.) Therefore, it would have been obvious to one of ordinary skill in the art to use the cylindrical fuel cell design disclosed by MacKelvie in the fuel cell taught by Kawana et al. in order to make a simple and economical fuel cell design.

Allowable Subject Matter

Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art fails to suggest the inclusion of an air filter in the oxidant/coolant passages of a fuel cell with an air flow which results in a stoichiometric air flow rate between 25 and 140.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol Chaney whose telephone number is (703) 305-3777. The examiner can normally be reached on Mon - Fri 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 703-308-2383. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Carol Chaney
Primary Examiner
Art Unit 1745

cc